PRIVATE SECTOR DOWNSIZING: *IMPLICATIONS FOR DOD*

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The Department of Defense surges forward with plans to increase efficiency by downsizing its in-house laboratories. Corporate America's adventure with such policies during the past decade, however, has left it with strong second thoughts (as well as low employee morale, high turnover, stagnant profits, and little increase in productivity).

Since the end of the Cold War in the late 1980s, the Department of Defense (DoD) has been continuously engaged in reducing workforce levels, both military and civilian. These drawdowns have affected every defense agency and component, including the DoD's in-house laboratories. Workforce reductions at many of these laboratories are expected to exceed 40 percent by the end of this decade (as measured from a 1991 baseline).

Still, there are many voices, both within and outside of DoD, calling for most of the remaining work in these laboratories to be contracted out to the private sector. Proponents of this outsourcing strategy imagine that the remaining in-house workforce can be drawn down to some "irreducible core" number of employees —seemingly, the smaller the better—who would only engage in inherently governmental work. Implicit in this strategy is the assumption that the size of the irreducible core can be determined and in fact realized. Is this a valid assumption? Or, will the downsizing journey undertaken to reach this irreducible core destroy the very thing that is claimed should be preserved?

The private sector has now been engaged in downsizing for many years. As a result, a large body of literature dealing with lessons learned from corporate downsizing has accumulated. Tellingly, this literature demonstrates the many

negative effects of downsizing—its adverse impact on employee loyalty, the loss of invaluable corporate memory, and the resulting high cost of employee turnover. A study of this private sector experience could do much to inform decision makers who believe significant additional workforce reductions in the DoD's in-house laboratories can be sustained without doing irreparable harm to their ability to perform even a set of core functions.

In-House Laboratories—Evolution and Enduring Need

The present community of DoD in-house laboratories has a rich history, with roots stretching back for more than 150 years. Indeed, some of the Navy component activities that make up this community had their roots in legislation passed by Congress in 1841, which first established the Navy bureau system. Over time, the component activities of this community have evolved from small, specialized, laboratories focused on a particular component (e.g., fuse) or weapon (e.g., gun, torpedo) to warfare-oriented, Research, Development, Test and Evaluation (RDT&E), technical centers (Carlisle, 1996; Carlisle, 1997).

Over the past 40 years, many authoritative statements regarding the importance of maintaining an in-house laboratory capability in the DoD have been made (Steelman, 1947; President's Science Advisory Committee, 1958; Bell, 1962; Sheingold, 1966; Government Accounting Office, 1981; Messere, 1983; and Langenbeck, 1982). While these statements often reflected different emphasis, they all held the common assumption that there is an enduring need for such laboratories.

For example, in October 1961, during the height of the Cold War, then-Secretary of Defense Robert McNamara declared that "in-house laboratories shall be used as the primary means of carrying out Defense Department Research and Development programs." Some 15 years later, John Allen, then Deputy Director of Defense Research and Engineering (Research and Advanced Technology), stated in a Blue Ribbon panel study that although a lot of innovation in the Department's technology base came from contractors,

> No way has been found to preserve the combination of current technical expertise and long-term corporate memory other than setting up an organization wherein individuals can maintain a lasting and close association with their Service while staying involved in technology; in short, an in-house laboratory.

In its 1994 response to a laboratory review directive issued by President Bill Clinton, DoD stated that its laboratories are "integral components of the military departments' acquisition and combat support infrastructure." Furthermore, the response noted:

> The essential barrier to outsourcing, and thus the principal competitive advantage of the DoD labs, is their mission motivation in total congruence with the customer, their identification with

> and closeness to the warfighter of the U.S. Combatant commands… Only in-house, dedicated organizations truly share the commitment of their parent commands.

Such authoritative comments verify the continuing importance of in-house defense laboratories—there is little real debate over whether such labs are needed. But they provide little guidance on sizing this community. How many labs are needed, and how large or small should they be? How should their work be focused? The prevailing wisdom today is that they should be no larger than some irreducible core, and they should only do those things reserved exclusively to the government. This outlook derives from a few major sources, a major one being the downsizing efforts of corporations over the past couple of decades.

Drivers for Private Sector Downsizing

Corporate downsizing has been a trend for almost a quarter century. It has been driven by a number of pressures. Some of these pressures have varied over time (e.g., the effect of a recession). Others have exerted a more or less steady influence.

The first of these pressures was leveraged buyouts (LBOs). In the late 1970s and into the early 1980s, many companies became strapped with huge debt as the result of LBOs. To ease cash-flow concerns, many of these companies sought relief by cutting costs, mainly by workforce reductions.

A second pressure was recession. In the latter 1980s and into the 1990s, worldwide recession led to cutting costs and restructuring. As demand fell, companies found themselves with excess capacity. They reacted by cutting infrastructure and cutting people.

Moreover, this period witnessed unparalleled growth in global competition. Again, to survive in this environment, many companies resorted to cost-cutting measures. Some moved operations offshore to take advantage of cheap labor. Others made business process improvements and introduced more efficient plant equipment. In both cases the result was a lower demand for American labor, which led to downsizing.

"Corporate downsizing has been a trend for almost a quarter century."

Another factor has also fed the downsizing frenzy—the rush to increase bottom-line profitability. Since the early 1990s many corporate chief executive officers (CEOs) have pushed hard to increase bottom-line profitability, in part to drive up share prices. Church et al. (1996) states that attempting to reduce costs by reducing personnel tempts executives, because the only ways to increase profits are by increasing revenues or decreasing costs. Most agree that future costs are easier to predict than future revenues, and as "human resources represent costs...it seems logical to reduce those costs through decreasing the number of employees." The primary questions in many boardrooms are: What is the irreducible core number, and how do we get to the irreducible core number of employees we need to operate?

OFF WITH THEIR HEADS

As indicated, to raise profits a company can either increase revenues or cut costs. Labor costs loom large on corporate balance sheets—about 50 percent of operating costs in a service company—so naturally, attacking the payroll is the solution *du jour* for most CEOs (Coolidge, 1998). Coolidge notes that the focus on cutting headcount may be headstrong. Nevertheless, history has shown that reducing "headcount" has been the preferred method of cutting costs, largely because it seems to be the most expedient method.

While some literature indicates that downsizing can benefit an organization, at least in the short term, there is growing evidence that suggests downsizing is dysfunctional for both organizations and their employees. The costs of this strategy are enormous and usually underestimated. In fact, they often more than offset any anticipated benefits.

"Sometimes, downsizing too massive or frequent can put a company into a death spiral...."

Indeed, massive downsizing frequently generates more problems than it solves, and almost never achieves its original financial objectives (Borque, 1995; Gosselin, 1994; Dupuis, Boucher and Clavel, 1996). It frequently causes the best and brightest employees to leave the organization. And these are the very employees the organization needs to survive. The costs of replacing them with new employees are enormous for an organization that has lost its best people and, with them, their special know-how and expertise (Margulis, 1994; Dupuis, Boucher and Clavel, 1996).

Sometimes, downsizing too massive or frequent can put a company into a death spiral (Dupuis, Boucher and Clavel, 1996). This happens when the first round of downsizing does not produce the requisite result in savings, necessitating still more cuts. In the interim, those who remain become demoralized, overworked, and less productive. Revenue then falls and the company has to cut again.

Mark Mone (1997), citing a number of other studies, questions the efficacy of downsizing as a cost-cutting strategy. This literature points out that large-scale sample research matching firms by extent of decline, industry, size, and age, demonstrates that organizations that downsize have no better return on investment, sales gains or other objectively measured bottom-line outcomes than those organizations not downsizing.

Professor Kim Cameron, who has studied private sector downsizing for more than 20 years, comments (1997):

> [Downsizing] is most often implemented as a grenade strategy… you throw a grenade into a company and it explodes, eliminating the positions of a certain number of people. The problem is you have no way of telling precisely who is going to be affected. In the end, a corporation almost always loses corporate memory and company energy.

Research by Cameron and others confirms that whereas in the 1980s and early 1990s, downsizing almost always focused on head count, today CEOs are beginning

to consider the bigger picture of changing the culture of the organization. They recognize that merely cutting headcount, without attending to the fundamental problems causing inefficiency and lack of competitiveness, will mean the same problems will persist even after downsizing. Commenting on this, Cameron notes that "Companies are now realizing that they have to redesign to avoid the problem of overloading fewer workers with the same amount of work using the same organizational arrangements." What follows is a more in-depth analysis of the problems with downsizing.

Negative Effects of Cutting Headcount

First, downsizing often adversely affects employees remaining at the organization. Sharma (1996) provides a view increasingly held by researchers:

> Downsizing sounds good on paper, but it can cost a company a lot of money. People trained in important techniques and skills over the years expect their heads to hit the chopping block next, and get out as soon as they can. The company is left with the second best. One layoff can ruin morale for the next few years, and the cost of rebuilding can eat up the dollars saved by the original "cure" for the company's financial illness, and more.

Mone (1997), citing a great deal of the relevant literature, points out that organizational downsizing can have a variety of dysfunctional consequences on surviving employees. Indeed, the litany of negative effects these researchers have noted is almost mind-numbing: decreases in morale, trust, concentration, satisfaction, commitment, and productivity; increases in guilt, stress, workloads, absences, tardiness, theft, cynicism, and opportunism. Mone (1994) further indicates that increased turnover and intentions to leave may also follow downsizing.

Focusing on a specific instance listed above, we can see that the psychological effects of downsizing can infect the health of the surviving employees. For example, one study (La Voie, 1997) confirmed a relation between downsizing and subsequent employee absenteeism because of ill health. The study found that the extent to which employees' health was affected depended on the degree of downsizing. Specifically, it found that the rate of long-term sick leave (more than three days) was 1.9 to 6.9 times greater after major downsizing than after minor downsizing. Overall, long-term sick leave increased by 16 to 31 percent during this period of downsizing. Consequences of such trends on productivity are obvious.

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This effect is also the subject of a recent book by David Noer (1993). Noer believes that this "survivor sickness" can harm the organization's health, as survivors continue to be "angry, anxious, and depressed for years after the layoffs." He advocates serious intervention to deal with this sickness, to avoid emotional distress and productivity paralysis (Chaudron, 1994).

Finally, Kirsten Haggis has tried to make sense of this dizzying array of ill effects, classifying them into three clusters. These include fear (uncertainty, insecurity, "Why me?"), frustration (resentment, anger, blaming), and uneasiness (betrayal, distrust, disillusionment). If such emotions are not recognized and carefully dealt with, she asserts, they can in many ways cripple an organization.

"The possibility exists for cyber attacks of every type, and the results can be catastrophic."

Collectively, this research argues that the survivors—despite still having jobs—are primarily affected negatively by the downsizing experience. Consequently of course, their organization suffers.

The Emergence of the "Volunteer Workforce"

One major casualty of the downsizing trend, as might be expected from the above discussion, has been an erosion of worker loyalty to the organization. Decreased commitment has, in turn, resulted in increased employee turnover, with all of its associated costs. As a result, many businesses now consider keeping skilled employees a major problem, one which, if solved, can lead to greater competitive advantage.

The erosion of employee commitment has been well documented. Nearly 4 in 10 firms recently surveyed by William M. Mercer Inc. reported an upswing in turnover in the past 3 years. (Gemignani, 1998) Another study found that nationally, the average annual employee turnover rate for all companies is 12 percent (Bureau of National Affairs, 1998). In the United States there is a 30 percent turnover in all front-line jobs. A 1996 Wisconsin study found that "75 percent of the demand for new employees is simply to replace workers who have left a company." (Positive Directions, Inc., 1998; Pinkovitz, et al., 1996–97).

Perhaps this decline in commitment has been demonstrated most forcefully in a recent study by AON Consulting. Entitled "America@Work," it concludes that employee loyalty is a thing of the past. The study found that today's workers face more stress on the job, want more time for their personal lives, and will switch jobs for relatively small increases in pay. In fact, more than 25 percent of those surveyed said they would "jump ship" for a pay raise of 10 percent or less, while more than 50 percent said they would do so for a raise of 20 percent or less. As the authors note, "Today's workers are more educated, entrepreneurial, and independent than ever, and are more discerning in choosing where to work. Particularly in this tight labor market, it is getting much tougher for businesses to hang on to their best and brightest employees." (Stum, 1998)

Attracting and retaining employees in high-technology businesses, including defense, is a particularly troublesome issue. Part of the difficulty lies in recent employment trends in such areas. Luker and Lyons (1997), using data covering the period 1988–1996, found that the industrial composition of employment in research and development (R&D) -intensive, high-technology industries is shifting dramatically toward services industries,

as employment in R&D-intensive, defense-dependent manufacturing industries declines, and employment in civilian high-tech manufacturing remains essentially static.

In fact, their data demonstrate that R&D-intensive services accounted for all of the net increase in employment in the R&D-intensive sector since 1988, and grew more rapidly than did employment in the services division as a whole. In essence, more and more R&D workers in the United States are moving into the service sector where job turnover is particularly volatile. The authors comment:

> The closer a firm is to the technological frontier…the stronger will be its demand for high-tech workers…And no matter how many scientists and engineers there are, they are always in short supply. Job creation, job destruction, and…job switching… occur among the most technologically innovative firms, [and worker] instability, of course, can result in dynamic losses of knowledge…In order to attract and keep R&D talent, then, firms must cultivate well-articulated internal labor markets for scientists, engineers, and other classes of skilled employees, providing high wages and benefits, and emphasize participation in state-of-the-art projects.

The defense industry, which has in the past been so dependent on manufacturing, may also have difficulty keeping its R&D workers from moving to the lucrative non-defense service sector. Anecdotal evidence suggests recruitment is already a growing problem in the defense industrial sector, with some firms now offering bonuses of several thousand dollars to employees who bring in new recruits.

The problem could be even more acute for high-tech defense and manufacturing industries with a high proportion of information technology (IT) workers—for example electrical engineers, computer scientists, computer engineers, systems analysts, and computer programmers—because there is a growing shortage of such workers in the United States. The Department of Commerce (1997) has documented the extent of this shortage. As a result, salaries and benefits packages in the non-defense commercial IT sector are soaring as companies target defense workers, both in government and industry, as a prime source of new high-tech employees. Recently in *Government Executive* Magazine, Richard Lardner (1998) illustrates this trend in an article dealing with the ongoing brain drain at the National Security Agency, where mathematicians and IT workers are being lured away to the non-defense commercial sector by firms such as Price Waterhouse.

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The volunteer workforce, in sum, has fundamentally changed the kinds of issues and problems for today's corporate executives and managers. As Nancy Lyons points out, the best employees now "elect to work where they do simply because it's

the kind of place they like to show up at every day." They want challenging and exciting work, and they are in demand. This is why in a recent survey of 1,443 members of TEC (an international organization of CEOs), most cited hiring, training, and keeping employees as the major problem of managers today. There is no sign that this is changing.

Loss of Corporate Memory

Downsizing has had other dire consequences, one of the most important of which is loss of corporate memory. What exactly is corporate memory? Most individuals in an organization, especially the high performers, are storehouses of specialized knowledge. Most are also repositories of organizational folklore and oral tradition which, surprisingly, are essential to the smooth and efficient working of an organization. The knowledge and tradition includes experience in specific projects, networks with clients and contacts, familiarity with company culture, and awareness of an organization's informal relationships and decision-making processes. Collectively, this information is referred to as corporate memory.

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Any time people leave, whether voluntarily or involuntarily, they take with them some of this knowledge and lore. When the separation is voluntary, there is at least some opportunity to pass along the more important information to a successor. When the separation is involuntary (e.g., as a result of downsizing), there is a loss of corporate memory (van de Vliet, 1997).

The complex knowledge that departing employees take with them might include the individual's experience with particular projects. Loss of this knowledge can be both dangerous and expensive. Studies at Warwick University in England have shown that many companies reproduce their blunders on a regular basis. The management consultants McKinsey have concluded that many waste time and resources resolving problems that have previously been unraveled in the company. Reinventing the wheel is thus a much more common drain of corporate resources and creativity than most managers imagine. Moreover, as Arnold Kransdorff of Pencorp, the London-based business historians, has pointed out, the dangers of corporate memory loss are particularly acute in an era when downsizing and re-engineering have shortened job tenure to an average 6 years, against the backdrop of an eight-year trade cycle (van de Vliet, 1995).

Corporate amnesia can also be the result of the trend toward outsourcing, according to Margaret Graham, founding partner of the Winthrop Group in Cambridge, MA, one of the leading corporate memory and business history consultants in the United States. She notes that companies intent on reducing their capital base or handing off a problem by outsourcing a function forget the importance of "local knowledge, specific to the company," with serious consequences for productivity. (van de Vlient, 1995).

A number of analysts have also shown the connection between downsizing and

loss of corporate memory ("Corporate Amnesia," 1996). For example, Alan Downs, author of "Corporate Executions: The Ugly Truth About Layoffs—How Corporate Greed is Shattering Lives Companies and Communities," relates a telling anecdote. Downs points out that between 1985 and 1995, Apple laid off about 6,000 people, while at the same time increasing overall headcount each year. Commenting on this, he writes:

> This creates a churning environment of fear and confusion… Having worked at Apple, I know every time they've conducted one of these layoffs, there has been mass confusion; everyone is grasping for their piece of the pie. There's a lot of time lost. One result is that the company lost its competitive edge, failing to develop a new breakthrough product during this entire period.

With each layoff comes a loss of corporate memory, and with each loss of corporate memory comes a loss of productivity and competitiveness. "It's the knowledge, nuances and intuition we bring to day-to-day decision making," says James Challenger, president of Challenger, Gray & Christmas in Northbrook, IL. "A little bit of this invaluable corporate memory disappears each time an individual is laid off ("Losing Corporate Memory," 1996).

Some researchers consider corporate memory a major asset and element of the company's overall intellectual capital. Annie Brooking (1999) writes: "Companies are typically well versed in assessing and valuing tangible assets, such as buildings, machinery, cash and so forth, but such measures do not include the value of the workforce, their knowledge, the way they use computer systems and so on."

Corporate Memory in an R&D Organization

Corporate memory is vitally important to an organization, such as a laboratory, heavily involved with R&D. How innovation occurs in such organizations is of great interest to many, and has been studied extensively. Carlisle (1997) provides a bibliographic guide to some of this literature.

It is becoming clear that much of the innovation depends on informal networks in the organization, networks that until recently have been underappreciated. For one, they enable the collaboration key to innovation. Kreiner and Schultz (1993) have studied informal networks in R&D organizations. Noting the importance of such networks, they point out that "accounts of informal ways of collaborating are dramatically under-represented in the literature, and even then, are often only acknowledged in passing." Examples they cite include "skunkworks" (Quinn, 1985; Peters, 1988), "bootleg research" (Burgelman and Sayles, 1986), and similar concepts that allude to informal patterns within the research lab.

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Other researchers reach the same conclusions. Ryne and Teargarden (1997), considering innovation in technical organizations, argue that three critical variables underpin the value-added creation process: skilled human assets; skilled senior leadership, and adequate resources. If any one of the three is absent, value-added creation is unlikely. Competitive organizations use a strong culture to bond these three variables in ways that cultivate core competencies and capabilities. In this analysis, attracting and retaining these skilled technical employees is a crucial technology-based competitive strategy. Indeed, "the ability of the firm to use science and technology to provide value-added products and services is a critical core competence which can yield competitive advantage for firms pursuing technology-based competitive strategies."

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Moreover, as Ryne and Teargarden point out, firm-specific knowledge and ability is identified as "tacit knowledge." Polanyi (1967) and Kogut (1988) suggest this tacit knowledge provides competitive advantage since it is cumulative and slow to diffuse, as it is rooted in the firm's human assets (Rhyne and Teargarden, 1997) That is, it is a function of their culture, training, experience, and administrative heritage (corporate history). "This tacit knowledge is a key contribution of the skilled human assets variable to the value-added creation process."

The important point is that downsizing disrupts these informal networks and undermines the informal collaboration necessary for innovation. It "destroys informal bridges between departments, disrupts the information grapevine...and eliminates the friendships that bond people to the workplace" (Baker, 1996). It forces companies to reinvent the wheel, or spend time and money solving problems already solved in the past (van de Vliet, 1995). It also eliminates the firm's tacit knowledge, a key to competitive advantage. Consequently, it can debilitate high-technology organizations that depend on R&D and innovation for their survival.

Counting the True Cost of Employee Turnover

Although it negatively affects remaining workers, erodes loyalty, and weakens corporate memory, all these are only parts of the major problem with downsizing: It costs a ton of money. Researchers and businesses from all facets of the economy are reaching this same conclusion. High turnover rates carry all kinds of direct, indirect, visible, and hidden costs.

First are the visible, direct costs of turnover. These include advertising and marketing new positions; recruiting, hiring, relocating, and training new personnel, processing the paper work; paying overtime to employees taking up the interim slack; enduring the decrease in production as new employees learn their positions, paying unemployment claims, writing off the money spent training the

departed worker, and participating in meetings about departed employees (Positive Directions; Herman, 1997; "Turnover Costs," 1998; White, 1995; Manpower Bulletin, 1998; Birnbach, 1998; Fitzenz, 1997).

Second are the indirect, hidden costs of turnover. High rates of turnover cause multiple disruptions. Product delays occur in R&D, and potential manufacturing efficiencies are delayed or simply not reached. Customers are often lost, and quality, service, and morale decline. The company gets a reputation for its high turnover rate. Managers experience more stress, and work loads are increased in efforts to rebuild teams and the overall corporate culture. Moreover, these indirect expenses, which can amount to more than 80 percent of turnover costs, are rarely measured (Positive Directions; Herman; White).

Put these figures together and the cure is worse than the ailment. Estimates vary, but all demonstrate these high costs. Eric Rabinowitz, president of IHS HelpDesk Service, found that it cost $3,000 per person to bring on new hires. Kwasha Lipton estimates that replacing an employee costs an average of 150 percent of his salary for exempt workers, 175 percent for nonexempt workers. The Department of Labor estimates that replacing an employee costs one third of a new hire's annual salary. Others say a resignation costs about 1.3 times the annual salary of the one who left, others estimate anywhere from 25 to 200 percent of that salary, and still others say two to seven times annualized income.

Again, the Saratoga Institute has shown that on average, turnover costs for exempt employees are "a minimum of one year's pay and benefits, or a maximum of two years' pay and benefits." In a recent survey by William M. Mercer Inc., 45 percent of 206 medium-to-large U.S. companies reported that turnover costs more than $10,000 per employee replaced. Even a hamburger flipper at a fast food operation costs $500 dollars to replace, his manager $1,500. Regardless of the exact numbers or businesses, there is widespread agreement that turnover costs are somewhere between high and Olympian (Caggiano, 1998; Hansen, 1998; "Strategies for Managing Retention," 1998; Brannick, 1998; Birnbach; Herman; Fitzenz; Sunoo, 1998).

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The Emergence of the Strategy of Retention

As a result of the failures of downsizing, many companies and researchers have realized the value of retaining personnel and of achieving workforce stability. These analysts consider retention and stability not just a counterbalance to the excesses of downsizing, but a competitive strategy aligned with the realities of the volunteer workforce. Indeed, a review of the literature indicates that the effectiveness of this strategy is no longer an argument, but a given, and the question is no longer whether to implement it, but how to do it best.

Many companies now consider keeping good employees their number-one

problem. This is, as mentioned, at least partly a result of downsizing, which has made turnover so prevalent and problematic. Hundreds of companies and researchers have therefore examined why employees leave and how to keep them. Recruitment and retention replace downsizing and rightsiz-ing, with predictions that this pattern will remain for the foreseeable future. Experts now consider employee retention an essential competitive strategy (Caggiano, 1998; Positive Directions; "Strategies for Managing Retention," 1998; Moore et al., 1998; Herman, 1997).

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This means most directly that retention affects the bottom line. The logic of this argument is actually rather straightforward and intuitively obvious. Businesses serve customers, and dissatisfied customers go elsewhere. Consistency and predictability of service build effective, efficient, productive business relationships. Experienced employees know the customers and their employees, and in general, the longer they are around the more familiar and steadfast those relationships become. This kind of strength is difficult to measure, but it seems obvious that longevity leads to knowledge that in turn leads to profit (Herman, 1997).

As a result, a number of people now examine the causes of turnover. The role of downsizing in turnover has been discussed. Employees cite a number of reasons, in addition to pay, for leaving a company. Indeed, in more than 50 surveys the Institute of Employment Studies has conducted over the past decade, only 10 percent cited pay as their main reason for leaving. Most often, they blame unchallenging work, poor management, little chance for promotion, rigid pay and benefits plans, and pressure (Bevan, 1997).

It follows, then, that there are correlating reasons why people stay. Craig Fuller, chairman of the National Chamber Foundation, states "there are three core values that affect whether people stay in their existing jobs...security, fulfillment, and membership." Security means not only a decent salary, but also involves child rearing, career management, and retirement plans. Fulfillment means not just a nice working environment, but flexible schedules, dress codes, and attitudes, and working for a respected company. Membership means employees believe they can contribute to the company's goals ("How to Keep Good Employees," 1998).

In short, people stay in places they are glad to work. Matt Weinstein, a consultant based in Berkeley, points out the realities of this new workforce, arguing that employers must consider their effective employees volunteers. Similarly, Ed McCracken, CEO of Silicon Graphics, suggests viewing these employees as consultants who primarily want challenging work (Lyons, 1997). It seems to come down to this: Employees want to perform engaging work for a respected company whose success they not only affect but also help define, and they want to do so in an environment that allows flexibility for other priorities. And today, managing a mobile, opportunity-laden, in-demand workforce with those desires is a necessity for competitive advantage.

The recognition of these realities—turnover rates are at about 1.1 percent a

month, the highest in 10 years—has led to a flurry of research and efforts designed to retain competent personnel. Booz, Allen and Hamilton, Inc., is just one of hundreds of companies implementing flexible pay systems and a variety of career development programs. Other companies have realized they not only need someone in charge of training, but also need someone in charge of retention. Yet others employ other strategies, including stock option plans, negotiable retirement plans, and sharing profits from production improvements (Bernstein, 1998; Champy, 1997).

In fact, retention is developing into a field of study as researchers and managers review the literature, implement strategies, and then revise understandings.

In a review of much of this literature, DeLeon (1997) shows how the connection between turnover and commitment has led 60 to 80 percent of Fortune 500 companies to try retention programs. Individually negotiated contracts (INCs), negotiable benefits packages, and tailored business systems (TBS) are some popular efforts. A number of managers and CEOs offer anywhere from 3- to 15-step methods of satisfying and retaining employees. The point here is not to delve into the mechanics of retention, but to demonstrate that its acceptance as a necessary and powerful competitive strategy is widespread (DeLeon, 1998; Herman; Sailors and Sylvestre, 1994; Scheier, 1997).

This thinking stands in stark contrast to the downsizing and outsourcing efforts so widely advocated today in much of the DoD. As Diana DeLeon states, recent developments in the commercial sector demonstrate that current public sector strategies "are not just old, they are inflexible, and many times without the employee in mind" (DeLeon, 1998). In the DoD, what some offer as innovative, cost-cutting certainties about the irreducible core are now seen to represent outdated failures in the private sector.

Moreover, it is ironic that the effectiveness of retention, recently utilized in the commercial sector, but yet to be discovered in the civilian side of DoD, has long been practiced by the military where commanders are responsible for bringing people on board properly, and for their training, development, and retention. Indeed, retention is now seen as one of the military's major problems. The DoD, it seems, can learn not only from the private sector, but also from what is going on outside its own front door (Champy, 1997).

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While downsizing may provide short-term advantages for a company and its shareholders, experts agree that the long-term drawbacks are significant enough to warrant exploring all other options first. As Bill Gandossy of Hewitt and Associates states ("Losing Corporate Memory," 1996), "The cloud hovering over the workforce, and the paralysis, suggests that it is not a good way to build a viable organization that will stay focused on growth and prosperity."

Implications for Lab Downsizing Efforts

Just as in the private sector, most of the downsizing in the DoD's in-house labs in

recent years has been driven by the belief that decreased headcount translates into money saved. If the only measure of that is the money spent on payroll, this might appear to be the case. However, as much of the private sector has now realized, there are other factors in the overall equation. Most of these, such as loss of corporate memory and high cost of turnover, have been discussed already.

Private sector experience has shown that, when all such costs are rolled up, downsizing does not usually create the savings its advocates claim. Rather, it often ends up costing more, which is precisely why it is becoming increasingly passé in the private sector. To illustrate: An American Management Association survey has found that fewer than 45 percent of the companies downsizing over the past 10 years have reported profit increases.

"As experiments, failure is not only allowed, it is a key aspect of success in allowing the system to be refined in the same environment it will ultimately be used."

Among the Association's member companies, downsizing and job elimination are at their lowest levels of the 1990s. In June of 1997, only 19 percent of those firms were engaged in downsizing, compared to 28 percent in June of 1996. Even the defense industry itself is beginning to cut costs by reforming processes rather than laying off employees. Stephen S. Roach, Chief Economist at Morgan Stanley and one of the staunchest promoters of corporate downsizing, now admits that "Corporate America can't rely on the 'hollowing' tactics of downsizing to maintain market share in an expanding global economy…I'm now having second thoughts as to whether we have reached the promised land" (Hansen, 1998; "Companies Target Processes," 1998; Roach cited in Nova, 1998).

It has already been seen that, in efforts to eliminate redundancies and cut costs, most private sector companies went about downsizing using what professor Kim Cameron calls a "grenade" strategy. This is very much the approach DoD labs have been forced to take in their downsizing efforts. Why? Because force reductions in a public sector enterprise are governed by civil service and other rules that make it nearly impossible to target reductions within the workforce. Where the downsizing triggers a reduction in force (RIF), a large number of employees may suffer collateral damage through the process known as bumping and retreating. In the end, who goes and who stays is often determined by seniority, veteran's status, or some other such factor.

And, while many reductions to date have been effected without RIFs, they have been implemented through a variety of "voluntary early retirement" and "separation incentive pay" inducements. These approaches too make it difficult for management to target the reductions within the workforce because it is difficult to know who will ultimately take such "buy-out" offers. In short, downsizing the labs under current rules is just as apt to result in the loss of a valued employee as the elimination of a truly redundant one.

Ironically, the loss of key technical personnel during the reduction process in the DoD labs has led to the necessity of recruiting new scientific and engineering

talent even as these labs collectively continue to shed end strength. That is, the DoD labs are currently experiencing just the sort of "churning environment" that Alan Downs said described Apple Inc. between 1985 and 1995, when "…the company lost its competitive edge, failing to develop a new breakthrough product during this entire period." This raises a disturbing possibility—will this churning environment in the DoD labs have a similar impact on their innovation and productivity?

This environment is likely to persist in the DoD labs for many years as already programmed "savings" from various outsourcing and end-strength reduction initiatives are pursued. Is it realistic to expect that these labs can recruit and retain the "best and brightest" scientific and engineering talent in this churning environment?

Again, private sector experience suggests they cannot. Even putting aside the current disparity in salary and benefit packages between the public and private sector, it seems increasingly unlikely these labs will be able to attract and retain the technical talent to support even a set of core functions. Scientists and engineers, like other employees, want more than a decent salary and flexible benefits. They also want a stable and fulfilling work environment where they can achieve both their personal and professional ambitions—a place where they are glad to work. After all, as much of the private sector has recognized, today's high-achievers are part of the "volunteer" workforce.

Indeed, evidence is accumulating that this environment is already taking a toll on the scientific and engineering (S&E) workforce at these laboratories. Data collected by the Defense Manpower Data Center shows that over the 7-year period ending in September 1997, the DoD laboratory S&E workforce experienced a 3-year gain in average age to 42.6 years. At the same time, the number of S&Es eligible to retire grew by 4 percent to more than a quarter of the workforce.

A sampling of data suggests that most turnover is taking place among the younger to mid-career S&Es. Many are simply resigning their government jobs and moving into the private sector. With much of the corporate knowledge in these laboratories resident in the S&E workforce that is retirement eligible, and with few younger S&Es replacing them, the future of these laboratories seems in considerable doubt.

"Scientists and engineers, like other employees, want more than a decent salary and flexible benefits."

Even so, the accumulating mountain of evidence from private sector downsizing experience seems to have had little impact on those who maintain that the work of these laboratories can and should be further restricted to some irreducible set of core functions. This notion rests on the private sector analogy where many companies have focused on a set of core competencies. But this seems a misinterpretation of the ideas set forth by the originators of the idea of corporate core competencies, say Gary Hamel and C. K. Prahalad (Hamel and Prahalad, 1990). They point out that a core competency is a distinguishing integration of the organization's resources (e.g., facilities,

people, processes, technologies, etc.) and collective knowledge in a way that contributes significantly to the perceived customer benefits of the company's products and services.

There is no mention in the Hamel and Prahalad (1990) definition of a core competence of the number of resources necessary for its creation and maintenance. That is, the number of resources underpinning a core competence may be as many or as few as needed. Moreover, a com-pany's core competencies embrace all of its in-house employees—a blue-collar employee on the shop floor can be just as important as a senior scientist in the R&D laboratory. Both are carriers of corporate core competence. This stands in contrast to the idea of the irreducible core as currently employed in the DoD labs, where many of the employees are not considered part of the core—their jobs, it is said, can be outsourced without damage to the remaining organization.

But the definition of core competence as put forth by Hamel and Prahalad, and practiced by numerous successful companies, shows that personnel reductions are just as likely to damage competencies as facilitate them. For one, reductions destroy corporate memory, a principal element of the know-how or collective learning of the organization and is an essential element of core competence. Interestingly, this assertion is buttressed by a recent meta-analytic review of 20 organizational studies of the relationship between organizational size and innovation. This review demonstrated a positive relationship between size and innovation (Damanpour, 1992). Less is not always more in an R&D-based organization.

In short, the current DoD laboratory environment is not conducive to the maintenance of core competencies, recruiting and keeping able employees, and fostering innovation. Neither is it likely to be conducive to saving money considering the impact on morale and productivity of the current tumultuous environment. Although the figures vary from place to place and the evidence at this point is largely impressionistic, it appears that only about 25 percent of scientists and engineers relocated after the latest round of base closures and realignments. Furthermore, many of those who did relocate subsequently left the government, an experience not unlike that observed in the private sector, where more than 35 percent of employees who were relocated left the company within three years (Oltman and Malinak, 1998). Who would spend $50,000—not to mention the additional costs of rehiring, retraining, and so on—on a piece of equipment that would be thrown out in three years? How could the DoD reconstitute capabilities after the loss of so much corporate memory and talent?

The DoD's search for the irreducible core could, like the hero in Greek tragedy, destroy what it seeks to preserve. In this case, the protagonist's greatest strength—its ability to produce the most efficient, effective, advanced military in the world—is the very source of its demise, as the near exclusive emphasis on economy drives costs up and talent away.

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